ZOE

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A BIOLOGICAL JOURNAL.

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THE GEOGRAPHICAL DISTRIBUTION OF LAND BIRDS IN CALIFORNIA.

BY CHARLES A. KEELER.

California is of more than usual interest to the student of the geographical distribution of animals, from the fact that within its limits there are at least four distinct life areas represented; a circumstance which, I believe, does not occur within any like extent of territory in the United States. Some years ago Dr. J. G. Cooper published a paper on "The Fauna of California and its Geographical Distribution,"* and although it is still of great value, the extensive notes and observations which have been made on our avifauna since that day throw much new light on this subject. Then, too, Dr. Merriam, in a recent bulletin of the United States Department of Agriculture, "Fauna, No. 3," modifies all previously existing theories on the distribution of animals in North America. Thus it seems desirable, in the light of new facts and new theories, to reconsider the distribution of our birds.

The principal change from the life areas given by Dr. Cooper consists in uniting certain regions which he considered as separate; as for example, his Colorado Valley and Desert Region, and his Southern and Northern Sierra Region. Considering the hasty and incomplete survey of our fauna which had been made at that day, it is remarkable that his regions should coincide as closely as they do with those now recognized. As pointed out by Dr. Merriam,† all life areas in extra tropical North America may be divided into two great provinces—the Boreal and the Sonoran; and we find that California forms no exception to this rule. The Boreal Province sends down two long narrow interpenetrating arms with a general north and south trend, the western one lying along the coast, and the

*Proc. Cal. Acad. Sci. iv, pp. 61–81.

†North American Fauna, No. 3, p. 24.

eastern one in the interior. This interior Boreal Area has a tendency to isolate the two areas of the Sonoran Province.

As above remarked, these two great provinces have representatives of four sub-regions or areas in California, two being Boreal and two Sonoran in character. The territory occupied by the Coast Range of mountains, south nearly to latitude thirty-six degrees, forms one area which extends north to Alaska, and called by Dr. Merriam on his provisional map of North American life areas† the Pacific Coast Area. The other Boreal Area, which unites with the preceding in the northern part of the State, is restricted to the great interior range, the Sierra Nevada, and has a very characteristic bird fauna. Dr. Merriam gives us no specific name for this sub-region, but it seems to be so strongly marked as to warrant one, and for present purposes at least, the name Sierra Nevada Area may be used.

Of the Sonoran Province, the Sonoran Area, occupying the entire southeastern portion of the State, is the most strongly marked. It includes both the Colorado Valley and Desert Region of Cooper, and is the most distinctive area of the State. North of latitude thirty-six degrees the Great Basin Area enters our territory on a very narrow region east of the Sierra Nevada Mountains. This is also the fauna of the extreme northeastern corner of the State, but its presence within our limits is so restricted that it need only be considered as an incidental feature. According to Dr. Merriam's map, the Sonoran Area extends quite to the coast south of latitude thirty-five degrees, while all that is left of the Sonoran Province (the great interior valleys and coast region between latitudes thirty-five and thirty-eight degrees) is called the Californian Area. So far as the bird fauna is concerned, and I think the same will apply to all forms of life, the distinctive features of the Sonoran Area seem to be lost after reaching the Coast Range. This would leave a narrow strip of the southern coast area to be added to the Californian Area, apparently. But in considering the avifauna of the southern coast region from the southern boundary of the State north to latitude thirty-eight degrees, I find that it is made up of some forms characteristic of each area in the State, and the natural conclusion is that it is a transition or intermediate region, and it may properly be call-

†North American Fauna, No. 3, Map 5.

ed the California Transition Region. I will attempt later to justify this alteration of Dr. Merriam's map in restricting the Sonoran and Californian Areas, and introducing a transition region, but I might here call attention to a passage in Heilprin's work on the Distribution of Animals. Speaking of the Sonoran Transition Region, he says: "This tract, which, as already stated, comprises the peninsula of Lower California, the State of Sonora in Mexico, New Mexico, Arizona, and parts, not yet absolutely defined, of Nevada, California, Texas and Florida, is as far as the Mammalia and birds are concerned not very clearly differentiated. The intermingling of northern and southern elements, with a decided preponderance in favor of the former, is very great, and the peculiarities insignificant."

Before defining more in detail these life areas it may be of interest to note something of the causes which have produced the present distribution of birds in California. The State is traversed by two mountain chains inclosing the immense interior valley district watered by the Sacramento and San Joaquin Rivers and their tributaries. North of latitude forty-one degrees the country is mostly mountainous and coniferous trees form the characteristic vegetation. Near the coast the redwood is the most abundant tree. It is most continuous in this northern region, but extends southward, following for the most part the western slope of the Coast Range as far as latitude thirty-six degrees. South of latitude thirty-nine its prestige begins to be challenged by the oak, and as it extends southward its ranks become less in number and thinned, until it merges entirely into the oak groves. In the Sierra Nevada Mountains the coniferous forests, consisting of pine, fir, spruce, cedar and the Big Trees, extend in an almost unbroken chain from the northern limit of the State south nearly to latitude thirty-four degrees, where the two mountain ranges unite. Even here the coniferous belt does not end but extends southward in a more or less broken line, along the higher ranges and peaks, well into Lower California.

The country considered above is that belonging to the Boreal Province, and it will now be of interest to compare with it the territory included in the Sonoran Province. Excluding the transition region, its most marked physical feature is the absence of mountains. The great interior valley region is a vast plain occupying the center of the State and inclosed on all sides by mountains. The valley of the Sacramento River is almost entirely an oak grove, but

the San Joaquin and Tulare Lake region is comparatively destitute of trees. Still, the oak remains always the characteristic form wherever any trees grow. The country bounded on the east by the Colorado River, on the west by the Sierra Nevada Mountains (and farther south by the Coast Range), and extending a little north of latitude thirty-six degrees, is an arid region where the cactus forms the prevailing vegetation. This desert region constitutes the Sonoran Area. The only part of the State not yet considered is the southern coast district, or what I have called the Californian Transition Region. This country is mountainous, but the mountains are for the most part not high. The vegetation is of three distinct kinds —sagebrush or *Artemisia*, oaks and conifers. There is no part of the State in which this *Artemisia* is wholly absent, but it is in this region that it attains its maximum abundance.

Having now glanced at the main topographical and floral features of California, let us briefly consider the theories governing the distribution of birds, and see if the faunal areas, as enumerated above, are in accordance with our theories. In the first place, it must be distinctly borne in mind that in speaking of the geographical distribution of birds we refer only to their breeding range. Birds have such wonderful powers of locomotion that it is impossible, in most cases, to draw any sharp lines limiting their distribution even then, but regions may be indicated in which many forms have their center of abundance during the breeding season, and outside of which they are more or less rare. Such regions are called faunal areas. But what are the causes which make a bird abundant in one region and rare or wanting in an adjoining district? Dr. Merriam says:* "Omitting reference to the effects of physical barriers, which explain the differences in the life of disconnected continents, it may be stated that temperature and humidity are the most important causes governing distribution, and that temperature is more potent than humidity." As applied to life in general this is undoubtedly the true theory as is also his statement "that the temperature during the season of reproductive activity determines the distribution of life," but when we consider the case of birds, we find that the environment is perhaps the most powerful factor in determining and defining life areas. To be sure, it is due almost entirely to temperature

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* Fauna, No. 3, pp. 26–27.

and humidity that the floral features of a country (which constitute a bird's most important environment) have been formed; and thus these influences have been the indirect cause in determining the distribution of birds. All forms of life are more or less mutually dependent, and consequently whatever has effected the present distribution of plants has also produced the existing relation of birds.

Passing now from this fundamental cause of the distribution of birds to the secondary factor, let us consider the influence of environment on distribution. As is well known, there is a very accurate adjustment between the animals and plants of a region, necessarily produced by the struggle for existence and the survival of the fittest. This, in the course of ages, has produced a balance of power which makes animals to some extent necessary to the life of the plants inhabiting the same region, but more especially makes particular plants vitally essential to the life of certain animals. Thus it is that birds, when placed in a new environment, unless it happens to be one especially adapted to their needs, will soon be overcome in the struggle for existence. Wallace says:* "Many of them [land birds] are adapted to live only in woods, or in marshes, or in deserts; they need particular kinds of food or a limited range of temperature; and they are adapted to cope only with the special enemies or the particular group of competitors among which they have been developed. Such birds as these may pass again and again to a new country, but are never able to establish themselves in it; and it is this organic barrier, as it is termed, rather than any physical barrier, which in many cases determines the presence of a species in one area and its absence from another. While this factor of temperature does probably play some part in directly influencing the distribution of birds, I think it is a much less important one than the floral features of the country. Nevertheless, although no longer so vital an operating factor, it is, as above stated, the fundamental or primary cause, and we would accordingly expect to find temperature areas for the breeding season to correspond very closely with the distribution of birds; and this, indeed, seems to be the case, although sufficient data is wanting to prove it.

We have, then, three factors influencing the distribution of birds: first, physical barriers, such as large bodies of water or very high

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*Darwinism, pp. 355-356.

mountain ranges; second, climatic conditions (temperature and humidity), of the greatest importance as fundamental causes in establishing faunal areas in general; and third, organic conditions or floral environment, the principal cause now in operation in keeping distinct the various avifaunal areas. The first of these factors may be eliminated in the consideration of the geographical distribution of birds in California, as we have no barriers insurmountable by most species. The second factor we can also set aside, as not directly applying at the present time to birds; but the third is worthy of special consideration. In taking up each faunal area of the State separately, this dependence of bird life on the flora will be frequently pointed out, but one example illustrating this may not be inopportune at the present time. Two jays are found commonly along our coast, *Cyanocitta stelleri frontalis* and *Aphelocoma californica*. The former is distinctively a bird of the coniferous region and the latter of the oaks. Between latitudes thirty-six and thirty-nine degrees, where the redwood unites with the oak, the two species are about equally distributed, but they very seldom mingle. When a grove of redwoods lie within half a mile of an oak region, *Cyanocitta stelleri frontalis* will often be common in the former and wholly wanting in the latter, while the reverse is the case with the other species. This is only one of many cases which tend to prove that the distribution of a bird is intimately connected with and dependent on a certain form of plant life, in the absence of which, unless it could materially change its mode of living, it would soon be overcome in the struggle for existence.

A NEW ACHYRONYCHIA.

BY T. S. BRANDEGEE.

Among a number of interesting plants brought by Mr. G. P. Rixford from Owen's Valley, Inyo County, was the following, which is named for the discoverer:

ACHYRONYCHIA RIXFORDII. Annual (?), glabrous and glaucous, branching from the base; branches 10–15 cm. long, ramose, spreading: flowers in clusters in the axils of opposite, fleshy, linear-acuminate 10–15 mm. long leaves; stipules lacerate, the lower inclosing a mass of fringes: perianth 3 mm. long, the lower tubular portion one-

third as long as the segments, which are recurved-spreading, mucronate and scarious, with the exception of a small area of the central and lower part; the throat is furnished with five semicircular processes directed upward, covering the attachment of as many linear-acuminate staminodia (?), which are nearly as long as the perianth segments and recurved at the tip: stamens five alternate with the staminodia; filaments deltoid, very short: ovary nearly sessile, tapering upward into the stout style which is 3-lobed, recurved and stigmatiferous for its upper third; ovules usually three; seed solitary, erect, oblong-pyriform; embryo nearly linear, slightly curved; cotyledons longer than the radicle, accumbent or sometimes a little oblique.

This is the third and most northern species of *Achyronychia* known to botanists. *A. Cooperi*, credited to New Mexico, has been collected in the southern part of this State, in the Mojave Desert especially. *A. Parryi* is known only from central Mexico. The species here described is nearest the latter, but is a much handsomer plant. It differs especially in the proportions of the perianth, in the structure of the style and in the cotyledons, which are accumbent in *Rixfordii*, but incumbent in *Parryi*. It is probable, however, in view of these and other closely related plants with similar differences, that the value of the position of the cotyledons as a diagnostic has been overestimated.

MEXICAN NOTES. IV.

BY W. G. WRIGHT.

EL RIO is a river, twenty miles inland. I came by the diligence, or stage. Six little mules, harnessed two to the pole and four abreast in the lead, dragged the heavy coach through the miry sloughs amid the tangled thickets which cover the low-lying country between the salt sea and the foothills. When the mire is deeper than usual, or when the little animals stop through fatigue, an increase of shrieks from the driver (never an oath, upon my word) and unlimited strokes from his terrible whip, and the energetic outside application of clubs, stones and yells by the helper (for it takes two men to drive a diligence, a driver, and a helper who goes along to help extricate the stage if hopelessly stalled), soon arouse the mules

to life again. The way has been entirely through impenetrable thickets, so far as can be seen in the dim night, for all stages have a habit of starting at three or four o'clock in the morning, even for only a short journey. At break of day, among the first sights and sounds of the morning, were a dozen large birds (parrots) in a leafless treetop, screaming vociferously. Orchids (epiphytes) hang upon the limbs of bushes by the roadside. A dozen or two large orioles in yellow and black plumage form a charming picture; they look almost large enough for crows.

About sunrise we come to some cornfields in tassel at midwinter. Thatched huts become more frequent, and cultivated fields more plenty, till at nine o'clock we reach the river. It is in time of high water, and there is no bridge; the river cannot be forded, and there is no regular ferry-boat as usually a ford is practicable. So we wait to consider. Casting about, we see a hut near by with a bar and bottles in sight. Mescal bottles — ah, this mescal is the ruin of the nation! It appears to combine the evils of whisky, rum, beer and brandy all mixed into one infernal Mexican calamity. But the bar also suggests that perhaps coffee may be had there. We go in at a side door and are in a thatched hut, floorless except for the earth, the steep roof black with smoke and supported by tree trunks. A square table stands near by, and the women bring a chair, a box and other things to sit on, and seat us at the table. At the other side of the room is a bank of earth like a long, low table, upon which is a charcoal fire; there the cooking is done. The girls put water on to boil in an earthen vessel, and then put in black, overburned coffee; then pour out a pint-bowlful for each of the passengers, and offer damp brown sugar, but no milk, for milk is never used in the interior. A little sweet bread or cake is also given to each, and our morning meal is soon made. The charge is one real. Pending the completion of the breakfast, my companion had discovered that the smoky, black hut sheltered one of the handsomest girls in Mexico, and it required some time to get him outside again. Then we went to the river; it is wide and deep and rapid. After resting a while we are taken over in a "canoa," or hollowed log, nearly five feet across and forty feet long, but without seats. So we squat down along the sides, holding on to the gunwales of the tipping craft, then the boatman runs it up stream some distance to take advantage of the strong current, and then vigorous poling and

paddling soon brings us safely across. The pueblo on the other side is a mile away across a wide sand-bed and a lagoon, and we must walk across the sand and wade the lagoon. At the hotel in El Rio we learn that we can go no further to-day, as the stage with which we should connect is hopelessly mired down, so I start out to see what can be found.

It is a cloudy day, and but few butterflies are flying. One buprestid beetle on a flower is seized, but nothing else, and I turn my attention to the vegetation, which is better here than on the coast, as it is warmer and more sheltered from cool sea winds, and many plants, especially vines, are in blossom. One bearing loose racemes of pink flowers was especially abundant and noticeable. Another more delicate one, found in an old corn-field, is called "Lachryma de la Maria" (tears of the Virgin), and is the most exquisite thing I ever saw. A second species of larger, paler flower is called the same name, "del campo," and is not quite so exquisite. Another plant, a red asclepias, is very pretty; it is called "La Senorita." Still another leafy plant has silk pods like asclepias, but the flower is tubular. Of this I gather all the seed pods I find, and lay them on the ground to bring away as soon as I can get the flowers and some queer grasses. Upon reaching the spot again, lo! my seed-pods had vanished. The attendant crowd of idlers had stolen them.

OJO DE LA MONTE. Ojo is eye, and monte signifies a wood or forest, including all the trees and undergrowth as well, having thus no exact synonym in English. There are many "Ojos" in Mexico —of the mountain, of the plain, of water, and others. It means a particularly lovely or sightly place. Ojo de la Monte I found to be situated away up in the mountains, in the center of a wide basin or valley, quite surrounded by serrated mountain crests. The whole basin is covered with trees and brush and climbing plants, with here and there a small clearing, while meandering through the valley a small stream runs over its gravelly bed. In the center of the valley, on a raised plateau, is the town, so that it was plain whence the "eye" was derived. It has a population of three thousand, and of all this swarming crowd, not one of whom apparently has anything to do, only one man can speak English. As the diligence rattled in at its brave rate through the narrow streets, the brown natives crowded the windows and doors and irrupted into the hot streets, for the arrival of the stage is their only diversion and they

make the most of it. Nor often do they see a "Gringo's" face behind the frayed stage curtains, and they make the most of that, too. At length the stage stops. There is no hotel in the "eye," and only two places that a stranger can get anything to eat or a place to sleep. His bedding he brings with him or else goes without. As I stood at the door of the miserable room and looked at the crowd of natives without and then at the uninviting quarters within, I felt more isolated and alone than ever before in my life. But matters are not so bad as they seem. A comely woman, her mother and three lads were inside, and with unusual intelligence soon understood my wishes, and I was made at home. The boys brought in my impedimenta, and room was made for me generally, so that after the six mules had been led through the room into the safe corral in the rear I was given cordial welcome, and during my stay these people were generous and unfailing in their kindness and good-will.

One of my first discoveries was a lizard of formidable dimensions, some three or four feet long, at least it appeared so to me. It scampered rapidly off to its hole under a tree, and if it had not done so, doubtless I should have scampered in the opposite direction, for, as I understand things, a butterfly man has no use for four-foot lizards. Close by I saw something that I had use for—a three-tailed Papilio, such as are never seen in the United States—but before I could reach the place it had business elsewhere and floated off to the music of my regretful cry, and I saw it no more, nor even its like again in Mexico. The forested slopes of the higher ridges of the mountains were full of birds, among them many trogons—large birds with inconveniently long tails, which wave up and down in a ludicrous way as they slowly flap their wings in flight. In the valley also many birds were wintering. Boat-tail grackles were abundant and very tame—I could almost catch them in my butterfly net—and blackbirds of every stripe were represented by immense flocks. Here, also, I saw dozens of that magnificent bird, the wood ibis. With wings folded it is apparently wholly white, but in flight the wings are half jet black. They appeared nearly as large as blue cranes. Sometimes a flock of twenty would be in sight close by, being rather tame. One day I encountered a native who was hunting them; he said he sold the skins for a dollar and a half, and then had the meat to eat. His gun was a broken thing,

and the lock being useless, the only way he could explode it was to pull back the hammer by a wire, and then when a bead was made, to let go the wire and let the hammer strike the cap. These great birds lived chiefly on the banks of the little stream previously mentioned. On the margin of that stream I one day found a fine plant (*Hymenocallis adnata*) in blossom, and was greatly elated at my discovery. It has a cup-shaped blossom, with six long, white streamers on its margin—a most lovely thing. Some of the bulbs I brought away, and a couple of them were given to the Golden Gate conservatory. Others, taken to my own home, blossomed freely at Christmas time. One other thing of interest was also found upon the sands of this stream, the red-spotted *Cicindela Sommeri.* It was very wild, however, and as the places it favored were strewn with large stones, it generally escaped capture, even when carefully approached. I think it was the most difficult to take of any of its kind that I ever met.

One day toward the close of my stay one of the boys called me to go out and see "muy bonita pajaro;" I went, and he carefully led me into a little ravine and pointed out a beautiful crimson bird as large as a dove. It was hidden in a bush that was covered over with a vine of Aristolochia, or "Dutchman's pipe," in full blossom. Truly, the bird and its framing formed a most lovely picture. It certainly was one of the most brilliant and lovely things that I saw in all my journey, and I think it may well stand as the closing note of my Mexican experiences.

A FEW NOTES ON THE YELLOW-HAIRED PORCUPINE * (*Erethizon epixanthus* Brandt).

BY L. E. RICKSECKER.

Every species of animal is surrounded by other species that are its foes, and eternal vigilance is the price of life; however, vigilance only serves to detect the danger—the foe itself must either be met, distanced or deceived. To avoid destruction is the first law of nature with all animals, but the methods of accomplishing this are nearly as numerous as the species themselves. As the aggressor is almost invariably superior in size and strength, it stands to reason

* The observations given in this paper were chiefly derived from John Cooper, an enthusiastic old hunter, well known to the writer.

that flight is the common resort in the moment of danger. The varying elements of cunning, strategy, deception and mimicry, in pursuer and pursued, all play their parts in the vast game of nature, and to these some species add a powerful mal-odor or the poison of bite or sting.

Among mammals the porcupine exhibits one of the most unique modes of defense, relying almost entirely upon its bristling, spiny quills to ward off its enemies, and in this it has been so successful, for many generations, that whatever courage or fleetness of foot it may once have possessed has relapsed into insignificance. The old legend of the porcupine flinging its tail at its enemies is, at least as far as this species is concerned, a myth. When surprised, it makes no effort to retreat—its gait being an awkward wabble it would be easily overtaken—but drawing the feet and head under its body, it squats closely to the ground, with quills erect, defying attacks from every direction. Should the pursuer be a dog, and the occasion his first experience with this peculiar animal, he will generally rush on to the combat with the impetuous courage (?) so characteristic of canines when the victim is undersized or somewhat defenseless; however, one grab will suffice, and a howl of pain from a disgusted dog with his mouth sticking full of quills, is the invariable result. A more discreet dog, or one that has learned wisdom from previous encounters, may fare a trifle better; but it being a matter of habit with him to investigate objects that excite his curiosity, by the sense of smell, even he will be required to pay a painful penalty. Finding that barking at the animal or running around it has no effect, he ventures nearer and smells of the squatting lump, when the latter suddenly rises and leaves a number of quills sticking in the nose of the surprised dog. If tormented with the end of a stick or gun it will resent the attack in the same manner, always trying to drive its quills into the aggressor by an upward motion toward the same. This demonstration may be directed vertically or towards one side or another, according to the point from which the attack came, and may be repeated two or three times in rapid succession.

The coyote, having had years of experience in this kind of warfare, has developed sufficient sense to avoid such impulsive conduct towards the, to him, familiar porcupines. However, having a keen relish for the fat, savory rodents, their capture is managed by a less

dangerous method. The coyotes hunt in pairs, and having found their victim, cautiously turn it over on its back — using their paws for this purpose — and whilst it is struggling to regain its favorite position, they seize it, one by a fore-leg and the other by a hind-leg, and by tugging in opposite directions they succeed either in breaking the skin across the abdomen—which is as tender as a rabbit's, and without spines—or they render the animal incapable of further resistance. Then comes the act of disemboweling and the feast, after which but the empty skin remains. Young coyotes have often been observed with sore and maturated heads, presumably the result of injudicious haste in securing this prey. The spines being somewhat barbed, will, if once lodged in the mouth of an animal, penetrate deeper with every movement of the muscles, causing inflammation and sores, until they work out at the surface.

The yellow-haired porcupine is found abundantly in Modoc and Lassen counties, California, where it lives chiefly upon the buds and berries of the juniper, which occupies thousands of acres in these counties. They are so numerous in certain localities that their excrement covers the ground under their favorite trees. They do considerable damage to pine forests by eating the upper limbs, and it is probable that their diet embraces a wide range for they have been known to subsist, in times of scarcity, on the leaves of the common sage-brush.

Another interesting habit of these porcupines, and one which shows considerable reasoning power, is the construction of their roosts, upon which they sleep during the warm hours of the day. These are made by breaking down into a flat nest the tops of a tall bush, ten to fifteen feet high, and there, quite out of the reach of their inveterate foes, the coyotes, they bask in the hot sun. As many as three individuals have been observed upon one nest. Like the raccoon, they prefer hollow trees in which to rear their young; but as these are not available in the juniper region, they nest in the numerous crevices of the lava-beds.

Equipped with a splendid armor against the rapacious beasts and birds, with arboreal habits, taking it most of the time, out of reach of its only successful foe, and with an abundance of food, the porcupine of this region leads a comparatively safe and happy existence —and man alone, the general enemy of all creation, with his murderous gun, can seriously reduce their numbers or exterminate them.

A NEW JUNCO FROM CALIFORNIA.

(*Junco hyemalis thurberi.*)

BY A. W. ANTHONY.

Not long since I was shown by Mr. E. C. Thurber of Alhambra, California, two Juncos that differed from any that I had seen on this coast, and upon inquiry was considerably surprised to learn that he had found them nesting in abundance within twenty-five miles of Los Angeles, the exact spot being Wilson's Peak, in the San Gabriel Mountains, a spur of the San Bernardino range. As we could find but the single pair in the two or three private collections of Alhambra and Los Angeles, an expedition to Mt. Wilson was organized to obtain, if possible, a series of birds in late breeding plumage. A series was obtained, but owing to the lateness of the season (August 27th) only young birds and those in ragged moulting plumage could be found. A few of the best specimens, however, show enough of the fresh fall plumage to make them of some value.

In ascending the mountain the first Juncos were encountered at an elevation of about 3,000 feet, where two fully fledged young and one adult were taken, probably an isolated family, as no others were seen until near the summit, where they were very abundant at from 5,200 feet to 5,800 feet above the sea.

Owing to the very poor condition of the material at my command I was obliged to submit the series to Mr. Ridgway, hoping to find in the National Museum collection specimens from southern California in breeding plumage. Mr. Ridgway's reply to my letter was rather unexpected. He says: "We have perfectly typically specimens from the following northern localities: Mt. Lassen (June 8, C. H. Townsend), Ft. Crook (April 12, J. Frilner), Camp Bidwell (July 28, H. W. Henshaw), and Carson City, Nev. (April 3, R. Ridgway). In fact, with the possible exception of the coast district north of San Francisco, all of the birds breeding in California appear to be of this strongly marked race."

I take pleasure in naming this handsome Junco for the discoverer, Mr. E. C. Thurber of Alhambra, Cal.

Subsp. char. Similar to *J. h. oregonus*, but with sides paler and less extrusively pinkish; dorsal patch paler and more sharply defined.

Adult male. (Type No. 3072; coll., A. W. Anthony, Wilson's Peak, Cal., May 24th, 1890; E. C. Thurber, collector.) Head and neck all around sooty-black, sharply defined against the white breast and pale chestnut dorsal patch; lower parts and under tail coverts pure white; sides pale pinkish, grayish on flanks; wings and tail blackish, former with slightly hoary edgings of the primaries; three lateral rictrices white, the third with inner web broadly blackish; bill and feet flesh color.

DIMENSIONS OF JUNCO HYEMALIS THURBERI.

COLLECTION OF A. W. ANTHONY.

No.	Sex and Age.	Locality.	Date.	Wing.....	Tail.....	Exposed culmen.....	Depth of Bill..	Tarsus.....	Remarks.
				mm.	mm.	mm.	mm.	mm.	
3043	♂ ad	Wilson's Peak	Aug. 28, 1890	72	73	10	6	17	
3045	♀ ad	Wilson's Peak	Aug. 28, 1890	71	67	9	6	18	
3047	♂ ad	Wilson's Peak	Aug. 28, 1890	72	72	10	6	18	
3052	♂ ad	Wilson's Peak	Aug. 28, 1890	73	71	10	6	19	
3054	♂ ad	Wilson's Peak	Aug. 28, 1890	72	73	10	6	19	
3055	?♂ ad	Wilson's Peak	Aug. 28, 1890	72	68	10	6	19	
3058	?	Wilson's Peak	Aug. 28, 1890	68	65	9	6	18	
3071	♂ ad	Alhambra	Feb. 26, 1890	73	66	10	6	19	
3072	♂ ad	Wilson's Peak	May 24, 1890	73	65	10	6	19	Type.

DIGITALIS PURPUREA — the well-known and showy "Foxglove" of the gardens — is becoming freely naturalized by roadsides and along streams in Mendocino County. The long racemes of various colors add much to the beauty of the landscape.

RHAMNUS CALIFORNICA AND ITS ALLIES.

BY KATHARINE BRANDEGEE.

These shrubs, known locally on the Pacific Coast as "Wild Coffee," "Cascara Sagrada," and "Shittim Wood," have been subject to many vicissitudes in name as well as description. The northern *R. Purshiana*, although not free, has suffered much less than *R. Californica*, which is burdened with a mass of synonymy and misstatements, some of them to be excused on account of imperfect and fragmentary material and some with no excuse at all.

Dr. C. Hart Merriam, in his paper, "North American Fauna, No. 3," one of the perhaps unlooked-for consequences of which will be a material reduction of our species, has made western naturalists deeply indebted to him. His maps of Faunal areas show that there is at least one man in the eastern part of America with some comprehension of the peculiar distribution of our plants, for, as "all flesh is grass," the faunal area necessarily depends on the floral. It may be seen by a glance at these maps that the characteristic flora of California belongs to its great central valley reaching from Mt. Shasta in the north to Tehachapi in the south, and from the Coast Range on the west to the Sierra Nevada on the east, an area extending over more than six degrees of latitude and averaging a hundred miles in breadth. The remainder of the State is occupied by intrusions from the surrounding regions and by areas of transition. The boreal flora intrudes at the north in two arms running down the Coast Range and Sierra Nevada respectively; and in these extensions are found *R. Purshiana* and the glabrous forms of *R. Californica*. *R. tomentella* belongs to the central valley and its foothills, ascending the western side of the Sierra Nevada to the altitude of three thousand feet, where it merges gradually into the form described as *R. rubra*.

The original description of *R. Californica* Esch., is not accessible to me, but in Torrey & Gray's Flora it is described with "style 5-cleft! fruit 2-seeded, leaves deciduous." The first synonym, *R. oleifolius** Hook., was described and figured partly from Oregon and partly from Californian specimens, and therefore very probably includes the form since published as *R. occidentalis* Howell.†

*Flor. Bor. Am. i, Pl. 44.

†Greene, Pittonia ii, 15.

Nuttall, in Torrey & Gray's Flora of N. A., describing specimens from about Santa Barbara, says, "*R. oleifolius* * * pentandrous, fruit 2-seeded, globose, veins oblique and rather remote;" and in the next paragraph describes, from the same region, *R. laurifolius* Nutt. with a possible *R. leucodermis*, as "tetrandrous, veins approximated." Yet, differently as these are made to appear, no one now supposes they are anything but *R. Californica*.

Of the recent species proposed between the already too near *R. Californica* and *R. Purshiana*, the northern one, *R. occidentalis** is sought to be established on a character (the yellowness of the lower surface of the leaves) which is very common in most forms of *R. Californica*, but not constant even in *R. crocea*, of which it is supposed to be characteristic. *R. rubra*† was described as being 2-seeded and very unlike *R. Californica* in the red-brown tinge of the branches; but it having been shown‡ that the character given was almost exactly that of the last species as found in the western part of San Francisco, the author rejoins with a somewhat dramatic account§ of how Mr. Belding had assured him, while at the Calaveras Big Trees last June, "that he was confident it could not be [*R. Californica*], for the berries are red and not unpalatable." Mr. Belding is a zoölogist making no pretensions whatever to botanical knowledge. He has a reputation for scrupulous honesty in all his statements which it is greatly to be regretted is not shared by all naturalists. Of course he was unaware how very improbable it was that any species closely related to *Californica* should have such fruit, and that he was contradicting the statements of two botanists—Mr. C. F. Sonne of Truckee, and the writer, both perfectly familiar with the shrub on both slopes of the Sierra Nevada. However, to disabuse Mr. Belding's mind of the impression it had received several years before, when he had compared this mountain form with *tomentella*, the only other one known to him and which he had supposed to be typical *Californica*, he was requested to secure fruit when it should be ripe (in September) from the bushes the red fruit of which he had tasted. This fruit, sent in

*Pitt. ii, 15.

†Pitt. i, 68, 160.

‡Proc. Cal. Acad., ser. 2, i, 252.

§Pitt ii, 14–15.

due time by Mr. Clarence Sperry of the Big Tree Grove, proved of course to be as black as in any other form of *Californica*, and Mr. Belding's experience is but another reading of the old conundrum, "When is a black berry red?—when it is green."

In a recent paper by Dr. H. H. Rusby, Professor of Botany and Materia Medica in the College of Pharmacy, New York, entitled "Cascara Sagrada and Its Allies," received through the courtesy of Prof. W. M. Searby, the author dissents from the view of the very close relationship of the species, set forth by Professor Trelease and by the writer, and dealing with them from the pharmacist's standpoint, attempts to discriminate between *R. Californica* and *R. Purshiana*, first, by the relative strength of the medicinal extract; second, by the habitat; third, by its dimensions; fourth, by the wood; fifth, by the form and texture of the leaves; sixth, by the fruit; seventh, by the external appearance of the bark and its covering of lichens; and eighth, by the character and arrangement of the bast-bundles, resin-areas and medullary rays.

The name "Cascara sagrada" certainly applies to *Californica*, which is a popular remedy in many places in California, especially among the Mexican inhabitants, whose settlements reach not much farther north than San Francisco, and are, therefore, not in the region of typical *Purshiana*.

It is not probable that botanists will seriously consider the greater or less efficiency of the medicinal extract, as a means of distinguishing species, since variations in this respect are common in many plants, and the questions of soil, exposure, climate, age of the shrub, time of gathering, etc., have to be taken into consideration. In this connection it should be remembered that the proper time of gathering the bark must necessarily be different for at least each degree of latitude.

R. Purshiana differs somewhat in habit from *R. Californica*, but in the same respects and hardly as much as do other shrubs of a similar range, and undisputed *R. Californica* varies in much wider limits. Thus in the sand hills of the western part of San Francisco it grows, in all exposed locations, prostrate and spreading on the ground, and at this time is fast losing its leaves, while in sheltered spots, often within a few feet, many of the shoots are in blossom and few leaves have fallen. In Marin county, about Olema, only a few miles away, it makes small trees with distinct trunks often nearly

a foot in diameter. Wherever it grows in the open the leaves are thick and rather small; but if grown in the shade they are much larger and thinner, and this difference may often be observed in the same plant if partly sheltered and partly exposed. The increase in size as it grows in the shelter of the northern forests is to be expected, and is found also in *Ceanothus thyrsiflorus* and other shrubs.

The wood has been too little examined; but in fresh cuttings an inch or more in diameter, recently compared, the principal difference observed was in the much narrower annual rings of *R. Californica*, showing its much less luxuriant growth.

The claim of a real and constant difference in the venation of the leaves will be found as fallacious in the case of *Californica* and *Purshiana* as it is now known to be in the forms separated by Nuttall partly on this ground. Equally variable is the trivial character of the channeled midrib relied upon by Dr. Rusby.

The fruit of our species of Rhamnus has been persistently misrepresented—even *R. crocea* was described by Nuttall as having "fruit greenish or yellowish, usually 1-seeded!" In all our species of the Frangula section, the berries variously described as "black," "blackish-purple," "dark-purple," are the same. They are all globose when ripe; depressed-globose if 3-seeded, and as long or longer than broad if 1–2-seeded. *R. Californica* is usually 2-seeded, but a very considerable proportion of the berries have three seeds, and *R. Purshiana* varies in the same way. The drawing of the fruit of this species in Fl. Bor. Am. is very misleading—looking more like Ceanothus than Rhamnus. *R. rubra* at the original locality, the railway cutting above Truckee, is usually, though not by any means invariably, 2-seeded; but one or two hundred yards away, along the road to Lake Tahoe, older bushes are very commonly 3-seeded. It must be evident to everyone that so uncertain a character is valueless in classification. The lobing of the fruit is a similar persistent and annoying error. Prof. Coulter, for instance, in writing of the three species occurring in Colorado, says:

"*R. Caroliniana* * * * fruit globose, 3-seeded.

R. Californica * * * fruit blackish-purple, with thin pulp; 2–3-lobed, 2–3-seeded.

R. Purshiana * * * fruit black, broadly obovoid, 3-lobed and 3-seeded." Now, every western botanist knows that the fruit of the last two species is alike black and globose, without any lobing

whatever until, in drying, it shrivels about the seeds; and this being the case, there seems to be hardly sufficient distinction between them and *R. Caroliniana.*

In regard to the "characters and arrangement of the bast-bundles, resin-areas and medullary rays," their value in classification has yet to be tested, even if they hold good through large series of specimens, as in those of the writer at least, they fail to do. There is, so far as we know, no reason why these characters should not vary with age, exposure, climate and luxuriance in the same manner as the leaves do. It is, in fact, well known that the woody structure does so in many trees belonging to the same species, as for instance the Douglas Spruce *(Pseudotsuga Douglasii)* in which woodmen distinguish two varieties, not separable by any character of fruit or foliage.

R. tomentella furnishes one of the strongest arguments for the specific identity of *R. Californica* and *R. Purshiana.* It runs, in the northern part of Lake and Colusa counties, into broad-leaved forms, which apparently bear the same relation to *R. Purshiana* that the southern *tomentella* does to *Californica.* It can hardly be supposed that if the species are distinct each can have a variety *tomentella* varying in the same manner as the species.

Our California College of Pharmacy should settle the question of the comparative value of the barks. Both are readily accessible. *R. Californica* attains a respectable size in Marin county, near Olema. *R. Purshiana* reaches Russian River, and even, according to Dr. Behr, occurs in the vicinity of Freeport. The berries should be tested also; they are reported to share the properties of those of *R. catharticus*, the juice of which is sometimes used medicinally.

NOTES ON LILIACEÆ.

BY CARL PURDY.

During the season of 1890, I first saw *Brodiæa peduncularis.* I found it in eastern Lake County, growing in a rich soil, sand and mold, in stream beds. In October the leaves were still green and the fibrous roots fresh. I had expected to find it very close in general characteristics to *B. laxa*, but found it distinct enough. In that locality *B. laxa* grows on the drier grounds, *B. peduncularis*

in the creek beds, and at some points the species intermingle, but each retains its character. *B. peduncularis* seems unique in its liking for moist situations.

Last spring I found a peculiar and beautiful hybrid, between *Calochortus Maweanus* and *C. pulchellus*. The species grow together there, and my hybrid had the strong habit of *C. pulchellus*, and a yellow blossom, but the flower was open bell-shaped, and filled with silken hair like *C. Maweanus*.

Another peculiar Calochortus I observed high in the mountains, near Anderson Valley, Mendocino County. It was *C. luteus* var. *oculatus*, but very large-flowered. The gland, instead of being simply lunate, was doubly so, as if two glands were side by side on the base of each segment and connected. When the glands of Calochortus take such freaks it is hard to say on what the species are to be based. In this case there were hundreds of specimens with doubly lunate glands, with intermediate ones down to the ordinary form.

I had always thought of *Brodiæa congesta* as having but one flowering stalk from a bulb. I found this season some bulbs with as many as four flower scapes.

The heavy winter of last year had many results in the wild flower world. In some localities it induced a profusion of flower growth unprecedented. In others the cold injured many things. *Lilium Washingtonianum* of the Sierras fell far short of its usual magnificence. Early flowering stalks were frozen down. In some places there were no blossoms until nearly the first of September, and everywhere the bulbs dwindled in size. I should have imagined that the abundant moisture would have produced a contrary result.

Calochortus pulchellus is described as lemon-yellow. Last spring I noticed that many had a dark spot on gland. I called the attention of Sereno Watson to the variation, and he considered it worthy of a name—*C. pulchellus* var. *maculosus*.

East spring I grew some bulbs of *Allium Palmeri*, a Utah species, and discovered quite a novel thing in their formation of offsets. The offset, an almost perfect sphere, grows on a threadlike connection, and is carried to the surface of the ground, where by the drying of the connective it is left loose to seek its own destiny. In growing the various Liliaceæ I am constantly finding interesting facts, and hope to solve some knotty points.

LEPIDOPTERA FROM SAN JOSÉ DEL CABO.

BY H. H. BEHR.

Danais Berenice Cr., specimens 3.
Euptoieta Hegesia Cr., specimen 1.
Myscelia sp., Doubl., specimen 1.
Apodemia Caliginea Bull.?, specimens 3.
Lycæna Hanno Stoll, specimens 2.
Callidryas Argante Fabr., specimen 1.
Terias (Heurema) Jucunda Boisd., specimens 10.
Rhodocera (Gonopteryx) Chlorinde Godt., specimen 1.
Rhodocera Mærula Fabr., specimen 1.
Papilio Thoas L., var. *Cresphontes* Cram., specimen 1.
Achlyodes sp., specimens 2.
Macroglossa Tantalus L., specimen 1.
Aglaope sp., specimens 5.

The species enumerated above were collected by Mr. T. S. Brandegee, in the southern extremity of Baja California, in August and September, 1890. His time being occupied almost exclusively by the collection and study of the plants of that most interesting region, the entomological collection consists chiefly, of course, of such as came into his possession by favoring chance.

They coincide almost entirely with specimens received from Mazatlan, and furnish another proof that a development of independent botanical types is not always accompanied by an analogous development of entomological ones. This peculiarity may be observed at every step in biological studies in California where the abundance of botanical monotypes is accompanied by insect forms frequently identical with Atlantic and European types, and seldom deviating much from one or the other.

None of the species above mentioned are identical with those of our State, but several are congeneric. *Danais Berenice* is so near to our far-spreading *D. Plexippus* that, although erroneously, it has been considered by some to be a mere variation of it. *Apodemia caliginea* corresponds to our *A. Mormo* and *A. Virgulti*, but most of its relations belong in Mexico and Central America. *Euptoieta Hegesia* is reported from Southern California, although I have not yet seen a specimen captured there. *Lycæna Hanno*, *Terias ju-*

cunda, *Callidryas Argante*, *Rhodocera Mærula* and *R. Chlorinde* belong to the Southeastern United States and to Mexico. The same is the case with *Papilio Thoas* and *Macroglossa Tantalus*.

There remain only *Myscelia*, *Achlyodes* and *Aglaope* as endemic insects. The first, of which I possess two specimens, collected near Cape St. Lucas by the well-known Hungarian scientist Xantus, is so nearly related to an exceedingly variable species from Mazatlan that I hesitate to pronounce it distinct, especially as one of Xantus' specimens is rather intermediate.

Achlyodes is in a similar position.

The *Aglaope* is a very interesting type, connecting the Old World *Aglaope* with the American genus *Euchromia*. I possess a nearly related species from Mazatlan. All the essential characters agree with those of *A. Infausta* from Europe, but instead of the half diaphanous squamation of that insect, all four wings are thickly covered by scales of metallic lustre like that of the anterior wings of the Old World genus *Procris*, from which it differs, among many other attributes, by the posterior wings being not half diaphanous, but covered by the same squamation as the anterior ones. It is distinguished from all members of the group by its size, which makes it a giant not only in the genus, but in the whole family. It would be very interesting to know something of its larval state.

In most instances we are enabled by a knowledge of the prevailing types of Lepidoptera to form a rather correct idea of the character of the landscape, because it is an exception to find Lepidopterous larva on rare plants. They always take to the ruling genera, and this perhaps is one of the reasons why the poorest Lepidopterous fauna is connected with the most varied vegetation, and *vice versa*.

For instance, the exceedingly rich flora of the Cape of Good Hope or of South Australia exhibits fewer diurnals than the monotonous Tundra and stunted hillside forests of Arctic Siberia.

In the case of our Baja California species, they indicate by *Danais Berenice* a goodly number of Asclepiadaceæ and Apocynaceæ; by *Euptoieta*, the presence of Passifloraceæ or Malvaceæ; by *Lycæna Hanno Terias Jucunda*, and *Callidryas Arganti*, a prevalence of Leguminosæ on which these species feed exclusively.

On account of the very great labor involved in moving the California Academy of Sciences this number of Zoe is nearly a month late.

A DOOMED BIRD.

BY J. G. COOPER.

"What things we do see,
When we h'aint got no gun."—*Rusticus.*

In May, 1872, when traveling by wagon from San Diego to Los Angeles and encamped near the coast about what is now the southern boundary of Orange County, I was examining the geology of the low hills bordering the sea-beach, when I noticed a strange-looking and large bird sitting on a grassy hillside some distance from me. As I approached it, being on foot and not attempting to conceal myself, as I was armed only with a hammer and unprepared to attack it, I of course expected to see it fly away. But although, as I soon saw, it was a California vulture, generally a very shy bird, it seemed on this occasion quite the reverse, and I walked up to its side as it stood there with eyes wide open, as unconcerned as if it considered me a brother biped. I could see no sign of injury or disease about it; on the contrary, it was in splendid spring plumage and apparently a male. Nor did it seem a very old bird, but every feather was as clean and perfect as if painted in one of Audubon's finest plates. Its head and neck were of a light orange, showing that it was not a young bird, and it showed no sign of having surfeited itself on carrion lately. As I had never succeeded in shooting one of these birds, on account of their shyness and because I rarely carried a rifle, shot being nearly useless for killing them, I debated whether I should not take advantage of this lucky chance, and kill it with my hammer. It never moved except to open its bill in a lazy way when I pointed the hammer at it. But I was loaded with fossils and had several miles to walk to camp, so I did not feel like carrying a heavy bird, which looked at least as large as a twenty-five-pound turkey. It seemed an unfair advantage to take of a sick or starving, but harmless if not useful bird, so I left it to fulfill its destiny.

Now, whatever may have been the matter with this vulture, there is no doubt that the species is in process of extinction. To prove this, it is only necessary to read the notes compiled by Mr. L. Belding, in the "Land Birds of the Pacific District," one of the Academy's "Occasional Papers" issued this year, page 24. Taking these notes in the order of their dates, from Nuttall, 1840, to Beld-

ing, 1890, it is evident that the bird has rapidly grown scarce. I can testify myself that from my first observation of it in California, in 1855, I have seen fewer every year when I have been in localities the most suitable for them. There can be little doubt that unless protected our great vulture is doomed to rapid extinction.

The causes of this are not hard to perceive. Besides poison used to kill wild animals on which the vultures then feed, two others may be given. One is the much less abundance of cattle, sheep, etc., kept in those parts of the State, where grazing is giving way to agriculture and fruit-raising. The other is the foolish habit of men and boys, who take every opportunity of shooting these birds, merely because they are so large and make good marks for their rifles when they want to practice at vultures' heads as a preparation for the annual turkey shooting in the fall. Some may even believe that the vultures may injure their live stock, but with little reason.

Several years ago some liberal-minded legislator got a bill passed in this State forbidding the killing of this bird, for the reason that it is useful as a scavenger and not injurious. Very few of the present inhabitants of California probably know that there is such a law, and its annual publication as one of the game laws might help toward enforcing it. The vulture is certainly worth preserving if possible, for it is one of the native curiosities of the west coast, known from Lower California to Puget Sound, and the largest land bird of North America. In some of the Gulf States even the turkey buzzard and little black vulture are protected by law on account of their usefulness in consuming dead animals.

RECENT LITERATURE.

Land Birds of the Pacific District, by LYMAN BELDING.* This work forms a valuable catalogue of the birds inhabiting the "Pacific District," including California, Oregon, Washington and Nevada. It is based on the original observations of Mr. Belding and a number of volunteer assistants, together with references to most of the important publications relating to the ornithology of this region. Localities are cited at which each species was observed, together with annotations, generally very brief, as to its abundance,

* Occasional Papers of the California Academy of Sciences. II.

nesting, etc., thus making it a work of great service to the student of the migration and distribution of birds in this region. Too great credit cannot be given Mr. Belding for his thorough and conscientious work in the accumulation and arrangement of this great mass of material. There is, however, one serious omission, viz: the failure to sum up in a brief paragraph, after each species, the principle facts of its distribution as brought out by the individual citations of localities. It is often inconvenient to be obliged to wade through a mass of detail in order to get at some general fact, and the insertion of these generalizations would, to some extent, have increased the value of the work. In regard to migration, also, much still remains to be done, the facts at present available being greatly insufficient to draw full conclusions from.

In regard to accuracy, a very commendable spirit of care is seen throughout the work. It might have been advisable to have inserted references to all quotations, as is done in some cases. A few omissions have been noted, as follows: *Spinus psaltria arizonæ.*—One specimen collected at Haywards by Mr. W. O. Emerson, referred to in Ridgway's Manual, p. 399. *Ammodramus sandwichensis savanna.*—One specimen collected in the Volcan Mountains, San Diego county, March 10, 1884, by Mr. Emerson, identified by Mr. Ridgway. *Spizella pallida.*—Fort Mojave, "Common in April—two specimens," J. G. Cooper, M. D., Proc. Cal. Acad., ii, p. 122. *Piranga rubra cooperi.*—An additional record from Santa Barbara; Mr. Clark P. Streator says: "A very rare visitor. Mr. Dodge, a friend, saw two specimens last spring, and succeeded in shooting one." (O. & O., xi, p. 52.) *Dendroica graciæ.*—"One male taken near Santa Paula, May 3, 1881." B. W. Evermann, Auk, iii, p. 185. *Merula confinis.*—A specimen in the collection of Mr. W. O. Emerson, taken at Haywards, January 27, 1883, and identified by Mr. Ridgway. Mr. Belding finds no more definite authority for placing *Polioptila plumbea* among Pacific Coast birds than the general statement given in Ridgway's Manual. It has been recorded as follows: Fort Mojave, Cooper, Geol. Surv. Cal., I, p. 38. Yuma, common, F. Stephens, Ridgw. Orn. Cl. Bull. 2, p. 56. Palm Springs, San Diego Co., F. O. Johnson, Auk, vi, p. 280.

Greater precision might have been attained by giving, in a footnote, the original name under which a species was recorded, especially in every instance where there is any doubt as to the species or

variety intended. Thus *Lanius ludovicianus excubitorides* is omitted from the catalogue, but Mr. Henshaw is quoted as reporting *L. ludovicianus gambeli* from the "East slope" [of the Sierra Nevada Mountains]. Mr. Ridgway, in replying to a letter of interrogation on the shrikes in California, wrote as follows: "Two forms of *Lanius ludovicianus* are found in California—*L. l. excubitorides*, which occurs in the eastern and sometimes also the central portions of the State; and *L. l. gambeli*, which belongs chiefly to the coast district," etc.

With the few exceptions noted above, the work seems to furnish us with a complete list, so far as now known, of the birds of this region, together with many valuable notes on the migration and distribution of nearly all the species considered. A large part of these notes is the result of many years of earnest field work on the part of Mr. Belding, so that we feel doubly indebted to him for this most valuable production. C. A. K.

On a Collection of Birds made by Mr. Clark P. Streator in British Columbia, with Field Notes by the Collector. By FRANK M. CHAPMAN.* The region from which this collection was made has been hitherto almost unexplored ornithologically, and this list of the birds of the region is consequently of special value. In the words of the writer: "Mr. Streator's collections from the interior develop two interesting facts—first, a re-appearance here, west of the Rockies, of the Eastern type; second, a westward extension in the range of certain Eastern species." The remarkable north-westward extension of Eastern forms is a fact which has a most important bearing on the geographical distribution of animals. C. A. K.

THE AUK for October contains nothing relating to Pacific Coast birds except a description by William Brewster of "A New Subspecies of the Solitary Sandpiper" from Lower California. There is one unfortunate circumstance in this description, which is that it is based solely on autumnal birds in young plumage. Unless the subspecies is exceptionally strongly marked this is a very dangerous proceeding, especially when an adult male from the same region "in every respect is identical with autumnal adults * * * from the Eastern States.". C. A. K.

* Bull. Am. Mus. Nat. Hist., iii, Art. VII, p. 123.

Birds from the Coasts of Western North America and adjacent islands, collected in 1888–89, with Descriptions of New Species, by CHARLES H. TOWNSEND, Resident Naturalist of the Steamer Albatross. Extract. Proc. U. S. Nat. Mus., XIII, 131–142. Mr. Townsend gives a briefly annotated list of species taken or observed by him at places visited by the Albatross, no less than thirteen islands being landed at, but his time was often so limited that the work could be done but superficially. "It is proposed," he says, "to supplement the somewhat concise diagnoses of new species in this paper by more complete descriptions at another time." The new forms described are, from Clarion Island, *Speotyto rostrata*, *Zenaidura clarionensis*, *Troglodytes tanneri*, *Puffinus auricularis;* from Socorro Island, *Oceanodroma socorroensis;* from Ballenas Bay, Lower Cal., *Amphispiza belli cinerea;* from near mouth of Rio Colorado, Sonora, *Otocoris alpestris pallida;* from Santa Barbara Island, *Melospiza fasciata graminea;* from San Clemente Island, *Helminthophila celata sordida*, *Melospiza fasciata clementæ*, *Otocoris alpestris insularis*, which has since been found to be identical with *O. a. strigata*. Some of these new birds were founded upon an exceedingly small collection, and it is doubtful if all of those from the islands off the coast of California will prove actually new in the light of further investigation.

W. E. B.

Grasses of the Southwest, Part I, by Dr. GEORGE VASEY. This, which is Bulletin No. 12 of the Division of Botany, makes a new departure, being royal 8vo. in size. The typography and plates are much better than in previous Bulletins devoted to the grasses. A little bibliography would certainly be no disadvantage and localities marking the distribution would be a decided addition. It will evidently not be the fault of the Department of Agriculture if the people of the United States fail to recognize and appreciate their grasses.

New or Little Known Grasses—II. By F. LAMSON SCRIBNER. Reprint from Bull. Torr. Club, xvii, No. 9, with plates CV—CVIII. In this paper the author endeavors to identify the new genus and species *Rachidospermum Mexicanum* Vasey, with the little known *Jouvea straminea* Fourn. The question should be of comparatively easy settlement, for it is a common grass of the sandy beaches in southern Baja California, extending from Todos Santos around

Cape St. Lucas to La Paz. *Boutaloua Fourieriana* Vasey, is said to belong to *Pentarrhaphis* Kunth., believed to be identical with *Polyschistis* Presl. The species as arranged are *Pentarrhaphis, Fourieriana*, *P. scabra*, and *P. paupercula.*

Contributions from the U. S. National Herbarium No. III, by GEORGE VASEY and J. N. ROSE. This number contains a list of the plants collected by Dr. Edward Palmer in 1890, in Lower California and western Mexico, at La Paz, San Pedro Martir Island, Raza Island, Santa Rosalia Santa Agueda and Guaymas. The following species and varieties are described as new: *Krameria canescens* var. *paucifolia*, *Sphæralcea Californica*, *S. albiflora*, *S. violacea*, *Hermannia Palmeri*, *Fagonia Palmeri*, *Acacia Willardiana*, *Cæsalpinia* n. sp., *Houstonia arenaria*, *H. Brandegeana*, *H. brevipes*, *Coulterella* (n. gen.) *capitata*, *Hofmeisteria Laphamoides*, *Perityle aurea*, *Bidens Xantiana*, *Gilia Sonoræ*, *Cordia Watsoni*, *Krynitzkia peninsularis*, *Berginia Palmeri*, *Calophanes peninsularis*, *C. Californica*, *Justicia Palmeri*, *Atriplex insularis*, *Euphorbia blepharostipula* (!). The new genus *Coulterella*, named in honor of Prof. J. M. Coulter, is figured (Plate 1).

Horsfordia rotundifolia, p. 67, is probably the same as *H. Purisimæ*, Proc. Cal. Acad., ser. 2, ii, 135, which was distinguished from the preceding species mainly because that was described as an annual. The species found on the peninsula is certainly a woody perennial, but the description of *H. rotundifolia* may possibly be erroneous is this respect and the species identical.

In *Sphæralcea Californica* the authors state "the terminal part (wrongly called the 'horizontal projection at base' by Watson and Brandegee) is very broad and obtuse." Certainly, no such mistake in the position of the carpels was made as regards Mr. Brandegee's specimens. The horizontal empty portion at the base is about half the length of the upper.

The paper is very creditable to the authors and to the government. Typographically it is a very great improvement upon the previous number by the same authors.

Contributions to American Botany, xvii. I. *Miscellaneous Notes upon North American Plants, chiefly of the United States, with descriptions of New Species.* II. *Descriptions of New Plants from Northern Mexico, collected chiefly by Mr. C. G. Pringle in 1888 and*

1889. By SERENO WATSON. In the second of these papers eighty-six species are described as new. *Bursera pubescens* is admitted to be identical with *Veatchia Cedrosensis* Gray, but no mention is made of the earlier name of Bentham *(Schinus discolor)* yet, if priority of specific names is to be at all respected, this would appear to have the best of claims. It is not inappropriate, and has been figured. In the first paper *Sisymbrium humifusum* Vahl, is referred to a proposed section *Pseudarabis* of *Arabis*, and *A. Howellii* from the Siskiyou Mountains and from the White Mountains of Mono County is described. Four new species of *Streptanthus*, *S. Lemmoni*, *S. barbatus*, *S. Arizonicus* and *S. campestris*, are described as new, and a conspectus of the genus given, recognizing twenty-two species and reducing *S. peramœnus* and *S. albidus* Greene, to *S. glandulosus* Hook. *Silene multinervia* and *Trifolium Catalinæ* are described from the Californian Islands, the former collected also by C. R. Orcutt, Jamuel, San Diego County. Neither of these species have the look of native plants, but the author states that they have been compared with their nearest European relatives and found sufficiently distinct. Additional localities for the first are Santa Inez Mountains, back of Santa Barbara, and Pt. Sur, twenty-five miles south of Monterey. The Trifolium has been collected at Pt. Reyes. *Astragalus Forwoodii*, *Aster Forwoodii*, *Artemisia Forwoodii* and *Hieracium nigrocollinum* are from the Black Hills of Dakota, collected by Dr. H. W. Forwood. Two species of *Vicia*, *V. Thurberi* and *V. Hassei* are separated from *V. exigua* Nutt. The genus *Strophostyles* of Eliott is restored for a section of *Phaseolus*. The relations of the different genera into which *Spiræa* has been separated are discussed, and a new species of *Eriogynia*, *E. uniflora*, collected by Rev. F. D. Kelsey in Montana, described. In regard to the recent action of Prof. Greene in reviving Lindley's genus *Schizonotus*, and then creating a new generic name, *Solanoa*, for Dr. Gray's Asclepiadaceous genus *Schizonotus*, it is shown that the first one was antedated by Rafinesque's *Basilima* (1815), and the synonymy resulting was uncalled for. Concerning Prof. Greene's new species of *Neillia*, the author says:

"The *Neillia capitata* Greene, can be in no way separated from the ordinary *P. opulifolius*. His *N. malvacea*, also, judging from the characters, appears to be a common form of *P. Torreyi*, though there are, perhaps, characters other than those given by him upon which that species can be divided."

Eremiastrum Orcuttii, from the Colorado Desert, is named for

the discoverer; *Lepidospartum latisquamum* is described from Esmeralda County, Nevada; *Camassia Howellii* from Oregon, and *Ruppia occidentalis*, collected by Prof. J. Macoun, near Kamloops, British Columbia.

The rest of the paper is occupied by notes and fuller descriptions of previously published species. Among these, and of especial interest to the Pacific Coast, are the notes on our native palms.

Grasses and Forage Plants, and Catalogue of the Plants of Nebraska. By CHARLES E. BESSEY and HERBERT J. WEBBER. That these papers bear the name of Prof. Bessey is evidence of their value. The catalogue embraces 1900 numbers, about equally distributed between Cryptogams, with which the list begins, and Phanerogams. Localities are given for the species, and much care is shown in citing authorities. The paper is a very welcome contribution to our knowledge of the distribution of American plants.

Botanical Gazette XV.—May. Notes upon Stamens of Solanaceæ, with plate, by Byron D. Halsted. A new grass *(Rhachidospermum Mexicanum)*, with plate, by George Vasey. Grasses in the Wrong Genus, W. J. Beal. Preliminary Notes on Perityle, with plate, by J. N. Rose.—June. Contributions to the Knowledge of North American Sphagna, i, C. Warnstorf. Notes on the Flora of the Lake Superior Region, i, E. J. Hill. Some New Western Plants, W. M. Canby.—July. Notes on the Flora of the Lake Superior Region, ii, E. J. Hill. A New Ramularia on Cotton, George F. Atkinson. Notes on Technique, i, James Ellis Humphrey. On the Nature of Certain Plant Diseases, Alexander Livingston Kean. Apical Growth in Roots of *Marsilia quadrifolia* and *Equisetum arvense*, W. M. Andrews.—August. Contributions to the Knowledge of N. Am. Sphagna, ii, C. Warnstorf. Flowers and Insects, v, Charles Robertson. Fermentation of Bread, Katharine E. Golden. A New Helianthemum, Walter H. Evans.—September. Contributions to the Knowledge of N. Am. Sphagna, iii, C. Warnstorf. Botanical Papers at the Indianapolis Meeting of the A. A. A. S. Meeting of the Botanical Club at Indianapolis.—October. On the Genus Eriogynia (with plate), Sereno Watson. Contributions to the Knowledge of N. Am. Sphagna, iv, C. Warnstorf. Some Recent observations on Black Rot of the Grape, B. T. Galloway. Notes on North American Umbelliferæ (with plate), John M. Coulter and J. N. Rose. On the Structure and Development of the Lemon (with plate), L. S. Ross. Pithecolobium Texense, J. M. Coulter.

PROCEEDINGS OF SOCIETIES.

CALIFORNIA ACADEMY OF SCIENCES. *October 6, 1890.* Vice-President Dr. H. H. Behr in the chair.

The proposed amendment to the constitution providing for a class of associate members to which should belong all members hereafter admitted, other than working scientists, was read by S. W. Holladay, who explained that the provisions applied in no way to the present members. The necessary changes in the phraseology of succeeding clauses were also read and clearly explained.

Mr. E. J. Molera moved that the amendment be indefinitely postponed. Some discussion followed, in which Prof. S. B. Christy and others participated. Mr. Molera explained that he made the motion without prejudice, but wished the members to have a longer time for its consideration, and such time could not be had at present under our constitution, as action would have to be taken at this date or not at all for this year.

On division the motion was lost. The amendment was then adopted as read.

October 20, 1890. President Harkness in the chair.

Dr. George M. Sternberg was proposed for membership.

Mr. Henry Hemphill presented to the Society a very valuable collection of shells, Crustaceans, Fossils and Algæ.

Mr. Charles A. Keeler read a paper, illustrated by a colored map, of the Distribution of Land Birds in California. This map differs from the one recently published by Dr. C. Hart Merriam, in recognizing areas of transition, in which the avifauna is ill-defined.

The President announced the death of Captain R. S. Floyd, a member of this Society, made some remarks eulogizing his character and his labors in the construction of the observatory at Mt. Hamilton, and suggested that it was eminently proper that the observatory, to which so much of his life had been devoted, should give him a grave upon the mountain he loved so well.

On motion, a committee consisting of James T. Boyd, Thomas P. Madden and Ralph C. Harrison was appointed to prepare suitable resolutions on behalf of the Academy.

The President announced that this was the last meeting to be held in the old building, and as moving to the new building on Market street would commence immediately, the next regular bi-monthly meeting would be omitted.

NOTES.

Townshend S. Brandegee and Walter E. Bryant have returned from their biological exploration of the Cape region of Baja California. The season was very favorable on account of the abundant summer rains. The very interesting results will be published in the Proceedings of the California Academy of Sciences.

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